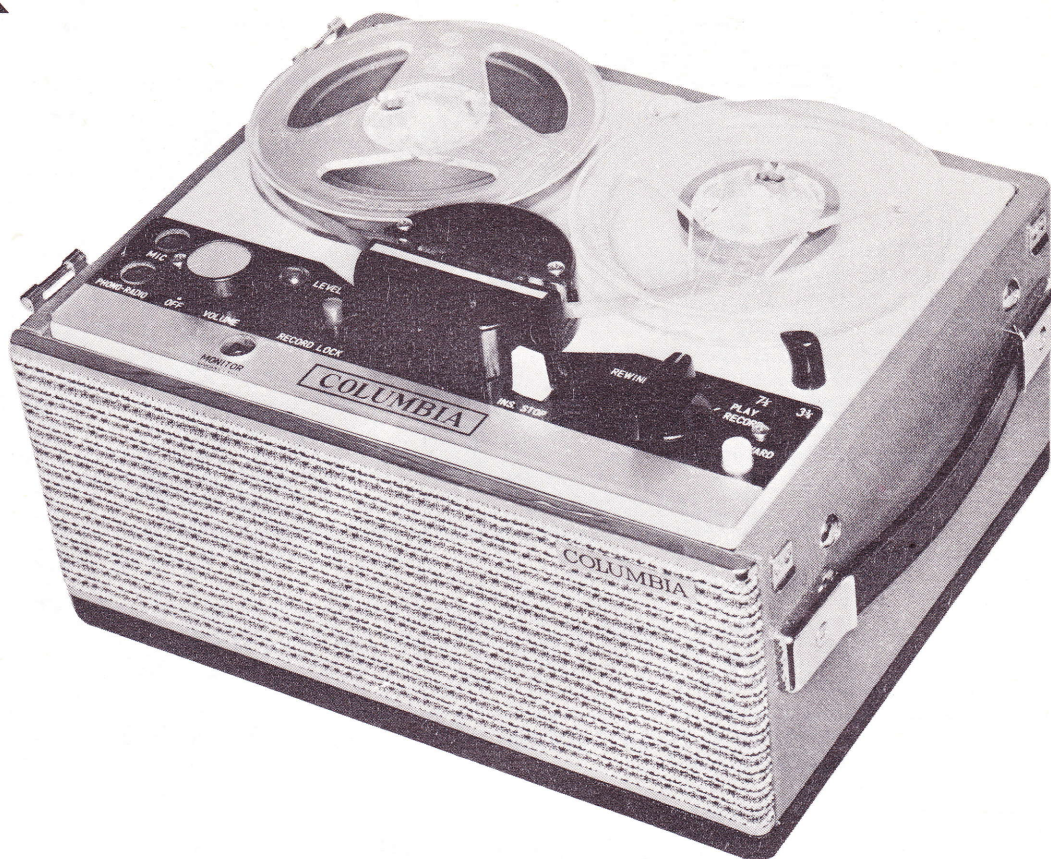
COLUMBIA
MODEL C690-TRCOLUMBIA
MODEL C690-TR

GENERAL INFORMATION

The Columbia Model C690-TR tape recorder is a two-speed tape recorder designed to play and record monaurally, two tracks on standard width recording tape.

Recordings may be made from a phonograph, radio, or television receiver as well as those made directly from the microphone.

The two tape speeds are $7\frac{1}{2}$ and $3\frac{3}{4}$ ips. Using both tracks, the recording and playing times are as follows:

| | | |
|--------------|------------------------|------------------------|
| Reel Size | $3\frac{3}{4}$ " Speed | $7\frac{1}{2}$ " Speed |
| 5" (600 ft.) | 1 hour | $1\frac{1}{2}$ hour |

This unit is designed to operate on 60 cycles, 110-120 volts, AC supply only.

Supplied By:

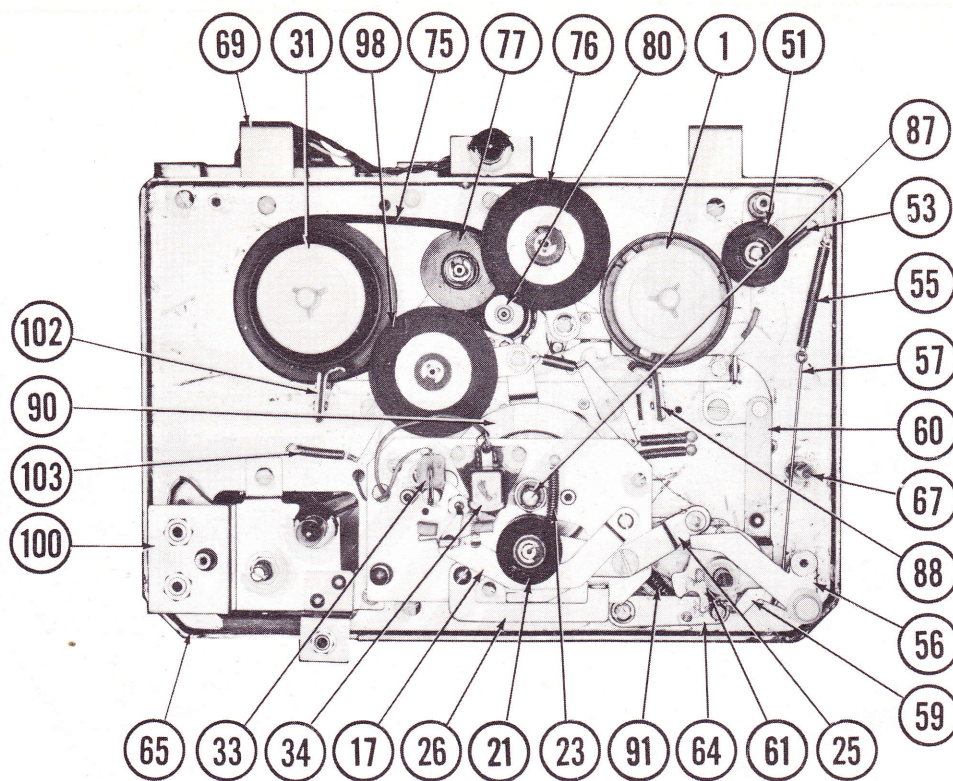
Columbia Phonographs
Dept. of CBS Electronics
405 Park Avenue
New York 22, N. Y.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of CQ451

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TOP VIEW OF MECHANISM WITH DRESS PLATE REMOVED

FUNCTION OF CONTROLS

On-Off Volume

The On-Off-Volume control energizes the motor and amplifier circuits. The volume controls the recording level when the unit is in the Record mode.

Function Selector

This control selects the different modes of operation. Turning this control counterclockwise from the Stop position, places the unit in the Rewind mode. Turning this control clockwise, places the unit in the Play Record mode.

Record Lock

Depress the Record Lock button to place the unit in the Record mode when the Function Selector is moved to the Play/Record position.

Forward Knob

The Forward knob winds the tape onto the takeup (right) reel. This is done by depressing the knob and moving the Function Selector to the Play Record position.

Instant Stop Key

The Instant Stop key allows the operator to stop the tape temporarily so as not to record unwanted portions such as commercials, etc.

Speed Change

Moving the speed change knob to the extreme counterclockwise position sets the motor speed for recording at 7 1/2 ips. When the knob is moved to the extreme clockwise position the motor speed is set for recording at 3 3/4 ips.

OPERATING INSTRUCTIONS

Threading The Tape

1. Place a reel of tape on supply (left) reel stand (31).
2. Place an empty reel on takeup (right) reel stand (1).
3. Unwind about 12" of tape from supply reel. Hold a section of tape taut and insert it in the tape slot. Make sure the dull coated side of tape faces the recording head.
4. Insert the free end of the tape into one of the

radial slots in the hub of the takeup reel. Turn the reel several turns counterclockwise to fasten the tape to the reel and to take up all slack between reels.

To Record From Microphone

1. Thread tape as described under "Threading the Tape".
2. Rotate the On-Off-Volume control clockwise to turn recorder on. Allow a sufficient time for tubes to warm up.
3. Insert the microphone plug into the "MIC" jack.
4. Set the speed change control for the desired recording speed.
5. Hold Record Lock knob down and move Function Selector to Play/Record position.
6. Hold the microphone about 8 to 12 inches from your mouth and speak in a normal voice.
7. Adjust the volume control until the record level indicator flashes on the loudest sounds.

NOTE: Recordings may be monitored by placing a crystal earphone in the Monitor jack.

IMPORTANT: Correct volume level on recording is very important. Too weak of a signal will result in weak playback and high background noise. Too strong of a signal will result in overloading and distortion during playback.

Recording Radio Programs

Radio programs may be recorded by one of the following methods:

1. Microphone Pickup from Speaker of Radio — Place the microphone about 8 to 12 inches in front of the radio speaker. Turn the radio volume control to a normal level. Turn the radio tone control to treble or high. Set the recording level and record as under "To Record From Microphone".
2. Direct Connection to Radio Speaker — Using the accessory cable, connect the alligator clips across the voice coil terminals of the radio speaker. Insert the cable plug into the "Radio-speaker". Insert the cable plug into the "Radio-Phono" jack. Set the radio volume and tone controls as described in Step 1. Set the recording level and proceed as described under "To Record From Microphone".
3. Direct Connection to Volume Control of Radio — Using the accessory cable, connect the alligator clips across the radio volume control. Insert the cable plug into the "Radio-Phono" jack. Set the recording level and proceed as described under "To Record From Microphone". The setting of the radio volume and tone controls will have no effect on this setup.

To Record From Phonograph

A phone type plug is required on the phonograph pickup leads. Insert this plug into the "Radio-Phono" jack and proceed as described under "To Record From Microphone".

To Record From a Television Receiver

Use one of the methods described under "Recording Radio Programs".

Dual Track Recording

These recorders are designed to record and play back on one-half the width of the tape at a time, thereby, resulting in two track recording. After the recording is completed, and all tape is wound on the takeup (right) reel, remove reels from recorder. Turn the reels over and place full reel on left spindle. Properly thread tape and proceed with recording. After the second track has been recorded, the first track can be played back in the same manner.

Rewind

To rewind the tape, turn the Function Selector knob to the Rewind position.

To Play a Recording

1. Thread the tape as described under "Threading the Tape".
2. Turn Function Selector knob to the Play position.
3. Adjust the volume control to the desired listening level.

To Erase a Recording

Any recording on the tape is automatically erased before a new one is put on the tape when the unit is in the Record position. To erase a recording without putting anything on tape, follow normal recording procedure but leave microphone disconnected and volume control at a minimum.

To Edit And Splice Tape

NOTE: It is impossible to edit and splice one track without affecting the other. Recordings to be edited should be limited to one track recordings only.

Tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements can be inserted between selections, etc. Unused tape can be spliced for reuse.

For best results, cut tape at a slight diagonal, butt ends together and fasten on glossy side with splicing tape. Trim off any excess width.

DISASSEMBLY

To Remove Recorder From Case

1. Remove case cover.
2. Remove screws (2 each) from each side and rear of case.
3. Lift recorder up and away from case far enough so the speaker leads can be disconnected.
4. Lift entire unit from case.
5. Reverse above procedure to reassemble.

To Remove Amplifier From Tape Transport

1. Remove the hex nut from the On-Off-Volume controls and remove the control.
2. Remove the hex nuts from the Microphone,

Radio-Phono, and Monitor jacks. Remove the jacks.

3. Remove the record level and ready lights from their mountings.
4. Disconnect the motor leads from the power transformer.
5. Disconnect the Record Playback and erase head wires.
6. Remove the three screws holding the tape transport to the amplifier chassis brackets.
7. Remove the tape transport from the amplifier chassis.
8. To reassemble, reverse above procedure.

CLEANING

Pressure roller (21), capstan shaft (87), tape guides (44), erase head (33), and play-record head (34) may accumulate tape oxide coating, worn off the tape as it passes these parts. This accumulation will cause poor performance and should be removed with a soft lint-free cloth dipped in alcohol.

LUBRICATION

Under normal operation, the mechanism should be lubricated once every three months. All bearing surfaces should be lubricated with a good grade of oil. Lubricate the cams and levers with a non-hardening grease. Make sure no oil or grease gets on the rubber surfaces of the drive wheels.

HEAD ADJUSTMENT

The Play-Record head (34) and the erase head (33) are aligned at the factory. The heads should not need adjustment unless they are replaced.

Play-Record Head

The top edge of the Play-Record head (34) must be set evenly with top edge of tape. Thread tape on recorder and adjust head by moving spring loaded screws (36) up or down to correct position. After ad-

justing head height, adjust rear screws (36) so that head is perpendicular to tape.

Erase Head

The erase head (33) should be adjusted so that the pole piece covers the top half of the tape. The face of the erase head should be as nearly perpendicular to tape as possible by visual alignment.

TROUBLE CHART

| Symptom | Cause | Remedy |
|------------------------|----------------------------------------|-----------------------------------------|
| No record or playback. | 1. Defective motor (74). | 1. Replace motor (74). |
| | 2. Defective idler wheel (98). | 2. Replace idler wheel (98). |
| | 3. Defective drive idler wheel (76). | 3. Replace drive idler wheel (76). |
| | 4. Broken spring (35). | 4. Replace spring (35). |
| | 5. Defective Play-Record head (34). | 5. Replace Play-Record head (34). |
| | 6. Broken pressure roller spring (23). | 6. Replace pressure roller spring (23). |
| No Rewind. | 1. Drive belt (75) broken. | 1. Replace drive belt (75). |

TROUBLE CHART (CON'T.)

| Symptom | Cause | Remedy |
|----------------------|-----------------------------------------|----------------------------------------|
| | 2. Defective motor service pulley (80). | 2. Replace motor service pulley (80). |
| No Erase. | 1. Defective Erase head (33). | 1. Replace Erase head (33). |
| Reel stands binding. | 1. Broken brake spring (53) or (103). | 1. Replace brake spring (53) or (103). |
| No Takeup. | 1. Broken spring (92). | 1. Replace spring (92). |

MECHANICAL PARTS LIST

| Ref. No. | Part No. | Description | Ref. No. | Part No. | Description |
|----------|----------|-------------------------|----------|----------|--------------------------------|
| 1 | 690-1 | Takeup Reel Stand | 54 | 690-54 | Bushing |
| 2 | 690-2 | Set Screw | 55 | 690-55 | Spring |
| 3 | 690-3 | Screw | 56 | 690-56 | Lock Bracket |
| 4 | 690-4 | Head Cover | 57 | 690-57 | Rod |
| 5 | 690-5 | Set Screw | 58 | 690-58 | Spring |
| 6 | 690-6 | Set Screw | 59 | 690-59 | Tension Bracket |
| 7 | 690-7 | Speed Change Knob | 60 | 690-60 | Slide Bracket |
| 8 | 690-8 | Function Control Knob | 61 | 690-61 | Function Cam |
| 9 | 690-9 | Screw | 62 | 690-62 | Spring |
| 10 | 690-10 | Instant Stop Tab | 63 | 690-63 | Record Control Bracket |
| 11 | 690-11 | Escutcheon | 64 | 690-64 | Function Cam Lever |
| 12 | 690-12 | Screw | 65 | 690-65 | Base Plate |
| 13 | 690-13 | Dress Plate | 66 | 690-66 | Pin |
| 14 | 690-14 | Forward Knob | 67 | 690-67 | Speed Change Shaft |
| 15 | 690-15 | Spring Plate | 68 | 690-68 | Speed Change Lever |
| 16 | 690-16 | Screw | 69 | 690-69 | Case Mounting Bracket |
| 17 | 690-17 | Tape Pad Bracket | 70 | 690-70 | Motor Board Mount Sleeve |
| 18 | 690-18 | "C" Washer | 71 | 690-71 | Grommet |
| 19 | 690-19 | Fibre Washer | 72 | 690-72 | Motor Board |
| 20 | 690-20 | Felt Washer | 73 | 690-73 | Motor Mount Sleeve |
| 21 | 690-21 | Pressure Roller | 74 | 690-74 | Motor |
| 22 | 690-22 | Washer | 75 | 690-75 | Drive Belt |
| 23 | 690-23 | Pressure Roller Spring | 76 | 690-76 | Drive Idler Wheel |
| 24 | 690-24 | Screw | 77 | 690-77 | Drive Pulley |
| 25 | 690-25 | Pressure Roller Bracket | 78 | 690-78 | Rewind Actuating Lever |
| 26 | 690-26 | Instant Stop Bracket | 79 | 690-79 | Drive Idler Wheel Bracket |
| 27 | 690-27 | Screw | 80 | 690-80 | Motor Service Pulley |
| 28 | 690-28 | Plate | 81 | 690-81 | Idler Wheel Bracket |
| 29 | 690-29 | Hex Nut | 82 | 690-82 | Drive Lever |
| 30 | 690-30 | Bushing | 83 | 690-83 | Spring |
| 31 | 690-31 | Supply Reel Stand | 84 | 690-84 | Spring |
| 32 | 690-32 | Volume Control Knob | 85 | 690-85 | Bracket |
| 33 | 690-33 | Erase Head | 86 | 690-86 | Idler Tension Bracket |
| 34 | 690-34 | Play-Record Head | 87 | 690-87 | Capstan Shaft |
| 35 | 690-35 | Spring | 88 | 690-88 | Right Brake Shoe Bracket |
| 36 | 690-36 | Head Adjustment Screw | 89 | 690-89 | Spring |
| 37 | 690-37 | Head Mounting Plate | 90 | 690-90 | Flywheel |
| 38 | 690-38 | Screw | 91 | 690-91 | Spring |
| 39 | 690-39 | Spring | 92 | 690-92 | Spring |
| 40 | 690-40 | Hex Nut | 93 | 690-93 | Spring |
| 41 | 690-41 | Erase Head Bracket | 94 | 690-94 | Speed Change Tension Spring |
| 42 | 690-42 | Screw | 95 | 690-95 | Spring Cap |
| 43 | 690-43 | Hex Nut | 96 | 690-96 | Bolt |
| 44 | 690-44 | Tape Guide | 97 | 690-97 | Supply Spindle Pulley Assembly |
| 45 | 690-45 | "C" Washer | 98 | 690-98 | Idler Wheel |
| 46 | 690-46 | Fibre Washer | 99 | 690-99 | Hex Nut |
| 47 | 690-47 | Upper Clutch | 100 | 690-100 | Mounting Plate |
| 48 | 690-48 | Felt Washer | 101 | 690-101 | Main Control Lever |
| 49 | 690-49 | Felt Washer | 102 | 690-102 | Left Brake Shoe Bracket |
| 50 | 690-50 | Lower Clutch | 103 | 690-103 | Spring |
| 51 | 690-51 | Tension Roller | 104 | 690-104 | Record Knob |
| 52 | 690-52 | Tension Roller Lever | 105 | 690-105 | Record Cam |
| 53 | 690-53 | Spring | 106 | 690-106 | Cam Stop |

COLUMBIA
MODEL C690-TR

FOLDER 8

ELECT. PARTS LIST AND DESCRIPTIONS

TUBES

| GENERAL ELECTRIC | | | RAYTHEON | | | SYLVANIA | | |
|------------------|--------------|-------|----------|---------------------------|--------|----------|--|--|
| ITEM No. | USE | TYPE | ITEM No. | USE | TYPE | | | |
| V1 | Preamplifier | 12AX7 | V2 | AF Amp. -Output-Bias Osc. | 12BH7A | | | |

ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | NOTES |
|----------|--------|-------|-------------------|------------------|---------------------------|------------------|--------------------|------------------|-------|
| | CAP. | VOLT. | COLUMBIA PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | |
| C1A | 20 | 300 | 16K476 | AFH3-28-30 | B0300 BRI045 | FP227 TC62 | TMD-2295 TD-10-450 | TVL-3639.8 | |
| C1B | 20 | 300 | | | | | | | |
| C1C | 20 | 300 | | | | | | | |
| C2 | 30 | 6 | 16K477 | PTT-6030 | NLW30-6 | TT6X30 | MLV30-6 | TE-1092 | |
| C3 | 25 | 25 | 16K478 | PTT-25025 | NLW25-25 | TT25X25 | MLV25-25 | TE-1207 | |

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING | REMARKS | REPLACEMENT DATA | | | | | |
|----------|-----------|---------|------------------|--------------------|---------------------------|------------------|------------------|------------------|
| | | | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ELMenco PART No. | MALLORY PART No. | SPRAGUE PART No. |
| C4 | .5 6V | | P282Z-5 | | WMF1P47E | IDP-4-504 | GEM-205 | 2PS-P50 |
| C5 | .01 400V | | P488N-01 | D6-103 | CUB4S1 | 4DP-1-103 | GEM-411 | 4TM-S10 |
| C6 | .01 400V | | P488N-01 | D6-103 | CUB4S1 | 4DP-1-103 | GEM-411 | 4TM-S10 |
| C7 | .01 400V | | P488N-01 | D6-103 | CUB4S1 | 4DP-1-103 | GEM-411 | 4TM-S10 |
| C8 | 300 5% | | | TCZ-300 | IR5D3 | CM-19B-301J | MCE241 | 10TCC-T30 |
| C9 | .01 400V | | P488N-01 | D6-103 | CUB4S1 | 4DP-1-103 | GEM-411 | 4TM-S10 |
| C10 | .001 400V | | P488N-001 | D6-102 | CUB6D1 | 6DP-1-102 | GEM-621 | 6TM-D10 |
| C11 | .005 400V | | P488N-005 | D6-502 | CUB6D5 | 6DP-1-502 | GEM-625 | 6TM-D5 |
| C12 | 200 10% | | NPO-SI 200 | TCZ-200 | 5R5 T2 | CM-19B-201K | CNO-320 | 10TCC-T20 |
| C13 | .005 400V | | P488N-005 | D6-502 | CUB6D5 | 6DP-1-502 | GEM-625 | 6TM-D50 |
| C14 | .002 400V | | P488N-002 | D6-202 | CUB6D2 | 6DP-1-202 | GEM-622 | 6TM-D20 |

CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|----------|------------|-------|-------------------|--------------------|--------------------|------------------|------------------|--------------------|
| | RESISTANCE | WATTS | COLUMBIA PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | CTS-IRC PART No. | MALLORY PART No. | |
| R1A | 500K | 1/2 | 9K671 | B-60-S | A47-500K-Z | Q13-133 | U48 | Volume |
| R1B | Shaft | | | Not Req. | KSS-3 | Not Req. | Not Req. | |
| R1C | Switch | | | Not Req. | SWE-12 | 76-1 | US-26 | Power Off-On Level |
| R2 | 500K | 1/2 | 9K672 | | | | | |

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | REPLACEMENT DATA | | | ITEM No. | RATING | REPLACEMENT DATA | | |
|----------|--------|------------------|---------------------|---------|----------|----------|------------------|---------------------|---------|
| | | IRC PART No. | WORKMAN TV PART No. | REMARKS | | | IRC PART No. | WORKMAN TV PART No. | REMARKS |
| R3 | 50K | | | | R16 | 100K | | | |
| R4 | 1meg | | | | R17 | 200K | | | |
| R5 | 2meg | | | | R18 | 1meg | | | |
| R6 | 250K | | | | R19 | 50K | | | |
| R7 | 3000Ω | | | | R20 | 30K 1W | | | |
| R8 | 250K | | | | R21 | 3000Ω | | | |
| R9 | 500K | | | | R22 | 250K | | | |
| R10 | 120K | | | | R23 | 1000Ω | | | |
| R11 | 50K | | | | R24 | 30K | | | |
| R12 | 2500Ω | | | | R25 | 10Ω | | | |
| R13 | 100K | | | | R26 | 2000Ω 1W | | | |
| R14 | 1meg | | | | R27 | 30K | | | |
| R15 | 150K | | | | | | | | |

COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA | | | | NOTES |
|----------|-----------|-------------------|----------------|-----------------|------------------|-------|
| | | COLUMBIA PART No. | Merit PART No. | Miller PART No. | Stancor PART No. | |
| L1 | Bias Osc. | 20K434 | | | | |

TRANSFORMER (POWER)

| ITEM No. | RATING | | | REPLACEMENT DATA | | | | | NOTES |
|----------|-------------|--------------|-----------|-------------------|----------------|------------------|---------------------|----------------|-------|
| | PRI. | SEC. 1 | SEC. 2 | COLUMBIA PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T1 | 117V @ .15A | 230V @ .015A | 6.3V @ 1A | 3K272 | | | | | |

TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | NOTES |
|----------|-----------|------|-------------------|----------------|------------------|---------------------|----------------|----------------------------|
| | PRI. | SEC. | COLUMBIA PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T2 | 12.5K | 3-4Ω | 3K273 | A-2933① | A-3879① | 24S98① | S-10X | ① Drill new mounting hole. |

SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|----------|--------|-------|------------|-------------------|---------------|-------|
| | SIZE | FIELD | V. C. IMP. | COLUMBIA PART No. | QUAM PART No. | |
| SP1 | 4"x 6" | PM | 3-4Ω | 1K181 | 46A1 | |

POWER RECTIFIERS

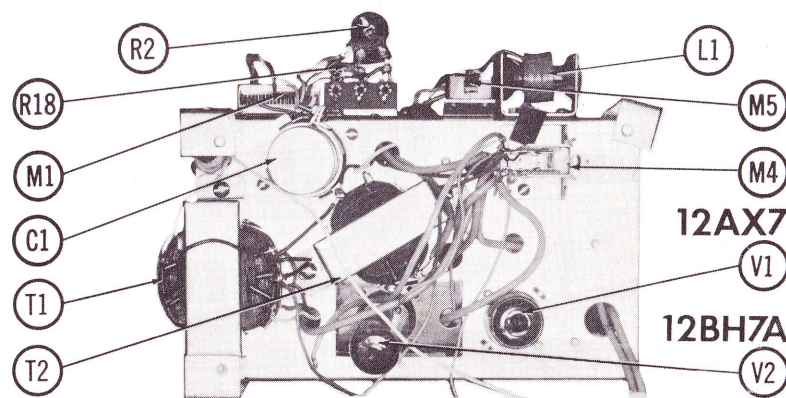
| ITEM No. | RATING | | REPLACEMENT DATA | | | | NOTES |
|----------|--------------------|--|-------------------|--------------|-------------------------|-------------------|------------|
| | CURRENT (Measured) | | COLUMBIA PART No. | RCA PART No. | SARKES TARZIAN PART No. | SYLVANIA PART No. | |
| M1 | .015A | | 10K624 * | | | | * Selenium |

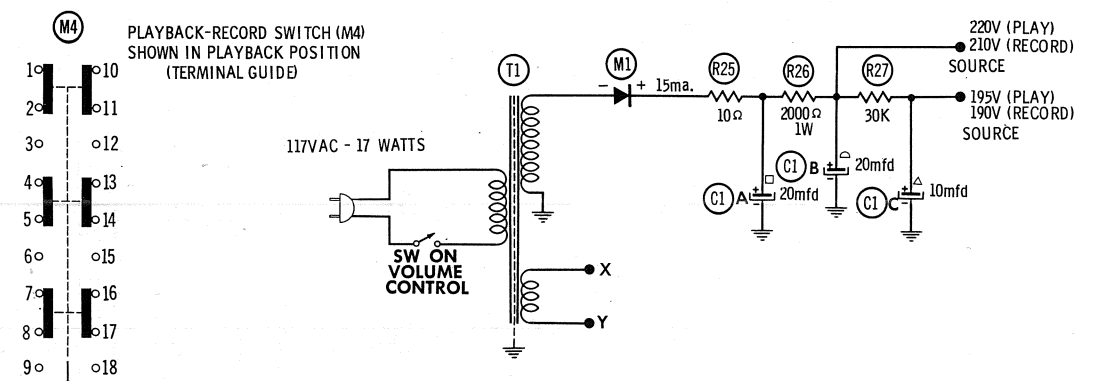
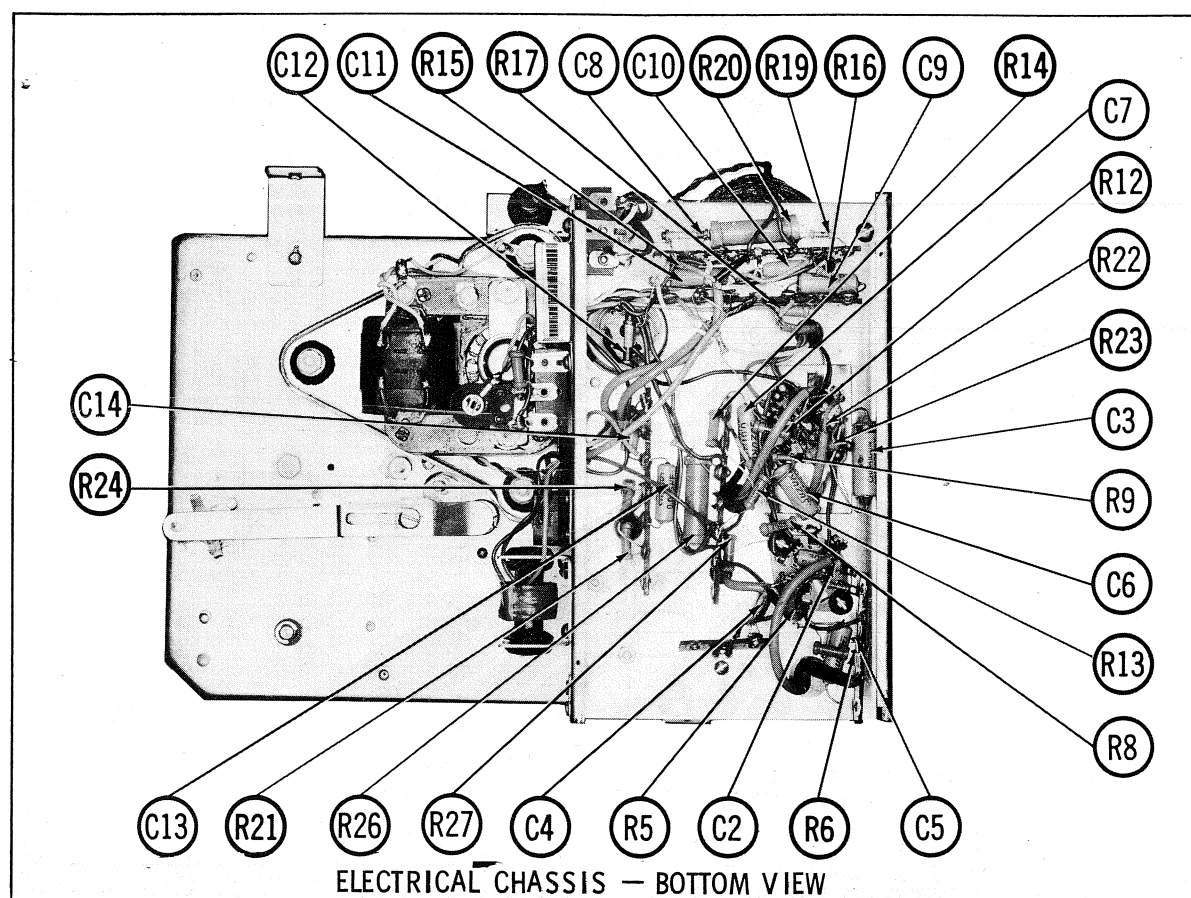
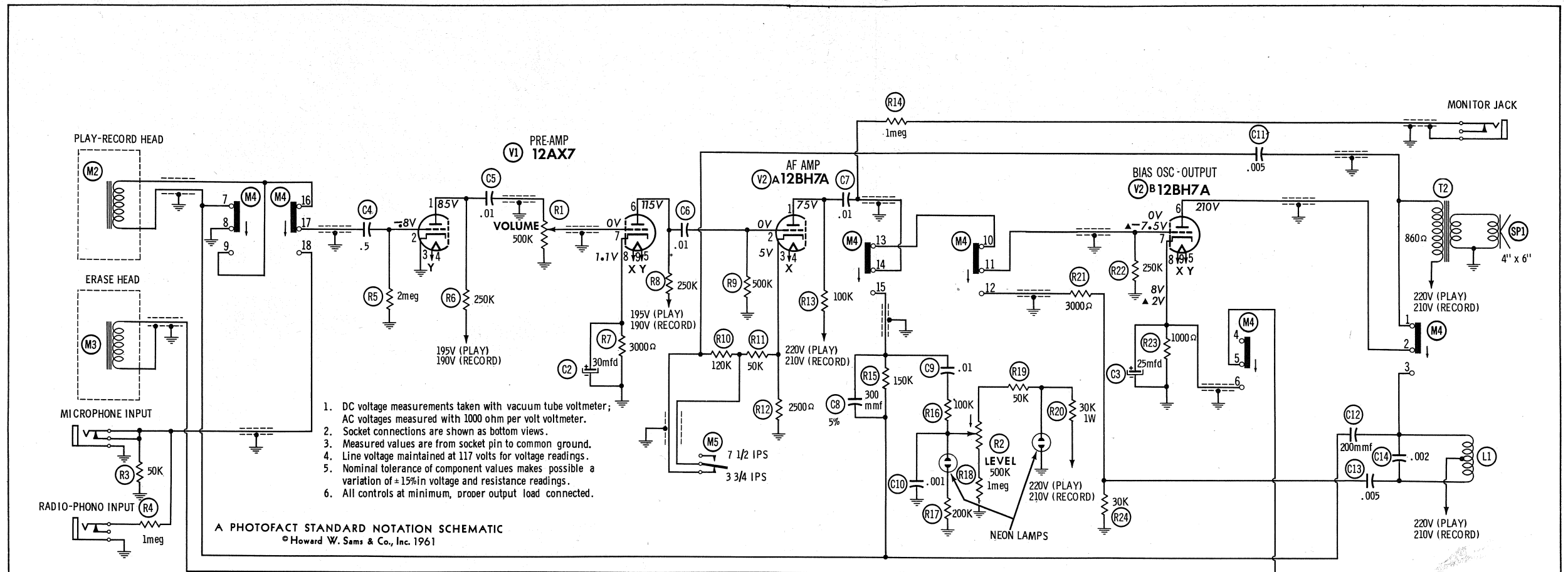
MISCELLANEOUS

| ITEM No. | PART NAME | COLUMBIA PART No. | NOTES |
|----------|-----------|-------------------|---------------------------------------|
| M2 | Head | 19K799 | Play-Record |
| M3 | Head | 19K800 | Erase |
| M4 | Switch | 19K801 | Slide Switch (DPDT) Function Selector |
| M5 | Switch | 19K802 | Speed Selector |
| M6 | Motor | 690-74 | |

WIRING DATA

General-use Unshielded Hook-up Wire Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting) Use BELDEN No. 8401
Phono Pick-up Arm Cable Use BELDEN No. 8430 (Two Conductor - Twisted)





RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|------|--------|----------------|-------|---------------|------------|------------|----------------------------------------------------|-----------------------|-----------------------------------------|-------|
| V1 | 12AX7 | \dagger 280K | 2meg | 0 Ω | 1 Ω | 1 Ω | \dagger 280K | 0 Ω | 3000 Ω | NC |
| V2 | 12BH7A | \dagger 100K | 500K | 2500 Ω | 1 Ω | 1 Ω | \dagger 3000 Ω \dagger 2100 Ω | 250K \dagger 33K | 1000 Ω \dagger 150 Ω | NC |

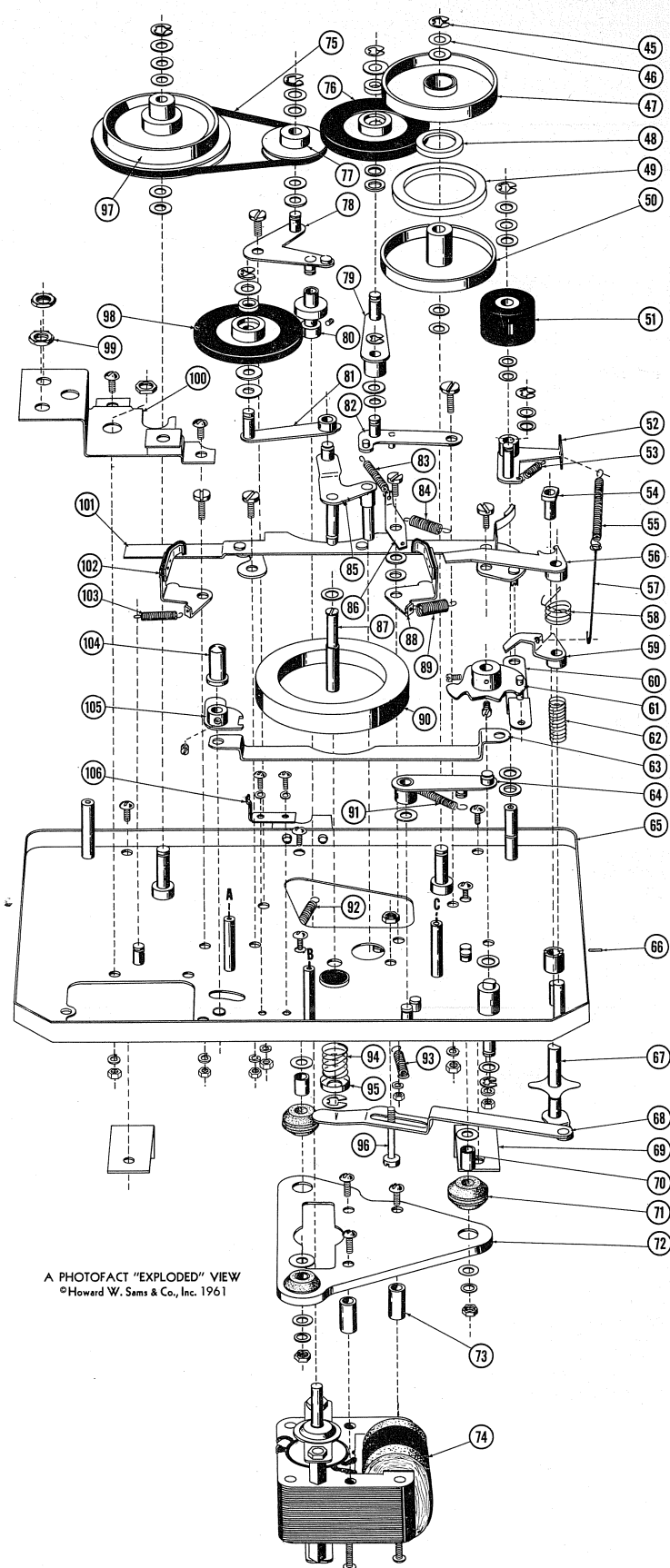
ALL MEASUREMENTS MADE IN "PLAY" POSITION UNLESS OTHERWISE DESIGNATED.

Δ MEASURED IN "RECORD" POSITION.

\dagger MEASURED FROM OUTPUT OF M1.

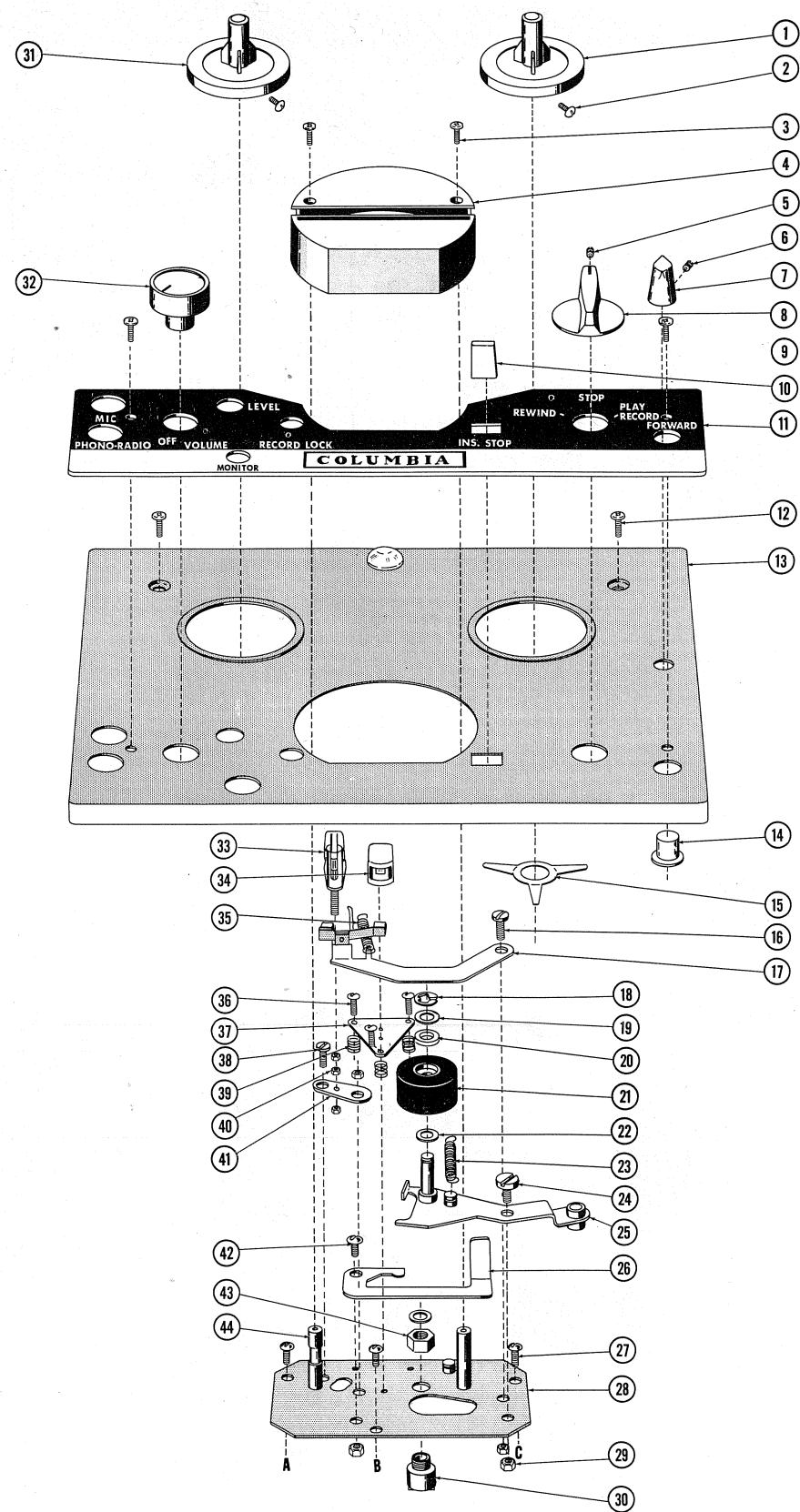
NC NO CONNECTION

COLUMBIA
 MODEL C690-TR



A PHOTOFAC "EXPLODED" VIEW
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EXPLODED VIEW OF PARTS BELOW BASE PLATE



A PHOTOFAC "EXPLODED" VIEW
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EXPLODED VIEW OF PARTS ABOVE BASE PLATE